

Clinical Section

The Ambulant Treatment of Hernia

By

T. E. HOLLAND, B.Sc., M.D., F.R.C.S. (Edin.)

The ambulant treatment of hernia by injection is not a new method. As long ago as 1835 Valpeau (1) successfully treated hernia by injection of iodine. Other surgeons published reports on their use of the method at intervals during the last century. Various solutions were used, such as Lugol's solution, 70% alcohol, fluid extract of the bark of *Quercus Albus* or White Oak, 10% Zinc Chloride, and so on. Uniformly good results were obtained, but in spite of this the method has failed to come into general use. The reason is pointed out by Mayer (2) who states that following publication of Warren's book (3) in 1881 on the injection method, various formulae for cure of hernia appeared on the market. Exaggerated claims were made for these, some even claiming that a single injection would bring about a cure. The composition of these formulae was kept secret and they sold at fabulous prices. One doctor in Chicago and two others in a town in New York State sold territories for the exploitation of their secret formulae, the prices ranging from five hundred to two thousand dollars. The formulae were sometimes sold to physicians who knew little of surgery and less of anatomy and who failed to realize that the injection method required skill in its application. The method was also immediately taken up by irregular practitioners everywhere who also possessed but little skill and as a consequence, the method itself was brought into undeserved disrepute.

In more recent years further work has been done and good results obtained. Mayer of Detroit in 1927 reported results of thirty years' use of the method in which 2,100 cases were treated with less than 2% recurrence. During the past four or five years, special work has been done by Drs. Bratrud (4) and McKinney and by Dr. Carl Rice (5) in Minneapolis, to put this work on a more scientific bases and it is their method which I have been using during the past year.

The object of this method of treatment is the introduction of a suitable substance which will produce proliferation of fibrous tissue in the inguinal canal which will effectually close the canal and prevent any protrusion from the abdomen, which is exactly what we aim to do by operation. My remarks in this paper will be limited to treatment of herniae of the inguinal types as my experience so far is limited to these types. Umbilical and femoral hernia have been treated by others but the results have been in some cases, less successful.

The prime requisites for this treatment are (1) that the hernia is entirely reducible and (2) that reduction may be maintained by use of a suitable truss. This truss must be worn night and day during the period of treatment and for two to three months after injections are completed.

The proper fitting of the truss is one of the most important parts of the treatment and one in which little or no instruction is given in medical schools. It is an art which can be learned only by experience and which for present purposes must be done by the surgeon himself.

The type of truss used must be varied to suit the individual patient. The most satisfactory is one of the spring types with a pad large enough to close the abdominal inguinal ring and keep the walls of the inguinal canal in apposition. In some patients with narrow hips the spring type sometimes tends to slide upwards over the iliac crests and an elastic type of truss is found more satisfactory.

Some trusses made of vulcanite are not affected by water and permit the patient to take a bath. A temporary truss of soft rubber may be substituted while bathing but the majority of patients must content themselves with a sponge bath while this treatment is in progress. It is necessary for a patient who has never worn a truss to do so for a week or ten days before injections are commenced, and my practice is to see the patient every day if possible to make corrections in the fitting of the truss until it is perfect. The first few days of wearing a truss very often produce excoriation of the skin which must be well hardened before beginning injections. A patient should not be conscious of the presence of a well fitting truss.

The solutions used have been improved considerably during the past few years. The desirable attributes of a good solution are (1) that it be practically painless when injected, (2) that it produce effective proliferation of fibrous tissue, (3) that there be a minimum amount of exudative reaction and (4) that it produce no systemic reaction.

A solution which has been extensively used is that of Pina Mestre (6) of Barcelona, Spain, who published results in 8,000 cases treated with his solution, which is composed of a number of vegetable tinctures, all of which contain some form of tannic acid and of course alcohol.

Another solution which has been used quite successfully in Minneapolis:

Phenol	2 parts
Alcohol	1 part
Lloyds Spec. Tr. of Thuja	1 part

This solution is irritant and requires injection of novocaine before injecting the solution. The amount used is 5 to 10 minims.

The solution used now by Drs. Bratrud (4) and McKinney is a distillate of several botanical herbs to which is added 0.1 per cent of tannic acid and 0.5 per cent Thymol. This is called Proliferol and is made by Ulmer Pharmacal Co., Minneapolis. The solution I am using at present is 5% sodium psyllate, a sodium salt of a fatty acid which produces satisfactory results and requires no preliminary local anaesthetic.

The patient is treated in the recumbent position. The same aseptic precautions are taken as for a major surgical operation. The skin is sterilized with acriflavine solution and a sterile 5 c.c. syringe and $2\frac{1}{2}$ inch, 22 gauge needle, is used. The needle is passed obliquely through the skin, then through the fascia of the external oblique muscle, which is recognized by a distinct sense of resistance being encountered, followed by a sense of release. The needle is directed downwards and medially so as to avoid penetrating the peritoneum. After injecting the solution the needle is withdrawn and pressure applied to prevent seepage along the needle track. The truss is then carefully applied and the patient allowed to go.

Treatments are given at intervals of two days, using 2-3 c.c. at each sitting. For the indirect type, the first injection is placed at the abdominal inguinal or internal ring. The second is placed deep to the cord in the region of the internal ring. The injections then proceed down the canal, finally closing the subcutaneous inguinal ring. It is important that the injections above and behind the cord be placed on the fascia Transversalis which forms the posterior wall of the canal. The average number of injections required is 9 or 10, some requiring less, others more.

The Direct Inguinal Hernia, which is the type we find when a hernia recurs after operation, is the one in which I think the injection treatment is specially valuable. Five out of the twenty five cases which I have treated have had a previous operation, recurrence taking place from two months to fifteen years later. The operation for a recurrent hernia is difficult and the results are notoriously bad. By injection it is possible to build up a wall of fibrous tissue where the hernia has passed through the Fascia Transversalis and the Falx Inguinalis and cure the hernia. In this type the injections are begun in the lower part of Hesselbach's Triangle and placed at regular intervals until the area is solid right down to the Subcutaneous Inguinal Ring. Usually more injections are required than in the Indirect type.

There are certain contraindications to this method which are as follows:

1. Irreducible or Incarcerated Hernia, or those associated with an undescended testicle.
2. Sliding hernia. It is doubtful if one can fit a truss which will control a sliding hernia.
3. Syphilis, tuberculosis and diabetes.
4. Carcinoma and any condition producing ascites.

5. Haemophilia.

6. Incisional Herniae, in which omentum or bowel may be present and adherent.

The age of the patient is not important in that cases have been done from 18 months of age to 80 years of age. In elderly people who are prone to develop chest symptoms and other post-operative complications, it is the method of choice.

Complications:

The most common complication is an induration of the cord, which is tender and quite localized. This has been proven to be due to an inflammatory reaction with exudation into the almost obliterated sac. It disappears gradually during 3-4 weeks.

Another complication which is very alarming to both patient and physician develops when the solution is placed in or near the peritoneal cavity. A fairly severe reaction comes on before the patient is off the table, characterized by severe pain, cold sweat, pallor and faintness. No change in pulse or blood pressure occurs and the symptoms gradually pass away in 20-30 minutes. I have had this happen only 4 times in over 200 injections. Two of these were in the same patient. No serious consequences resulted and the effects have been attributed to a chemical peritonitis as proven by laparotomy in cases in Minneapolis.

A case reported in the south treated by a doctor not surgically trained, developed abdominal pain and rigidity. Laparotomy revealed a loop of gangrenous small intestine which required resection. This was attributed to injection of the mesentery through faulty technique.

For a surgeon with a good knowledge of anatomy, who will take a little time and trouble to learn the technique, this method should be eminently safe. The position of the needle point must be accurately known at all times. The importance of structures such as the Peritoneum, Inferior Epigastric, External Iliac and Femoral Vessels, and the Spermatie Cord make this imperative but with an intimate knowledge of the anatomy of the region and use of the surgical landmarks, the operator should not encounter any serious difficulties.

The patient does have a certain amount of pain which varies in amount as does the individual reaction, some cases having very little, others experiencing aching type of pain for 4-5 hours after treatment, but very rarely is a patient obliged to lay off work and then not longer than a half a day or a day.

The histology of the method has been carefully worked out by Dr. Carl Rice (5) of Minneapolis. First working on dogs he demonstrated that injection into (1) the cord, did not produce obliteration of the Vas Deferens; microscopic section showed it to be normal in appearance and there was no sign of any obstruction. (2) into a vein, did not produce any serious systemic reaction and (3) into the peritoneum, while producing

pain, did not produce any more than a chemical peritonitis of which no trace existed when laparotomy was performed 24 hours later. No case of occlusion of the Vas Deferens is known nor has any case of atrophy of the testicle been reported.

In human beings Dr. Rice was able to secure biopsies in patients who either were uncertain as to whether they wanted their hernias treated by operation or by injection, or having had one or two injections, decided to have the operation. These were admitted to hospital at intervals so as to secure a sequence of histologic changes from 24 hours to forty-two days after injection of the irritating solution.

Microscopic sections of these biopsies show very strikingly the changes occurring at the site of injection over a period of six weeks. The section taken 24 hours after injection shows young fibroblasts present, also fixed connective tissue cells, round cells and polymorphs. Seven days after injection we find the fibroblasts more evident, new blood vessels are making their appearance and no polymorphonuclear leucocytes are to be seen. This is of special interest in that it denotes the satisfactory formation of new fibrous tissue without the severe irritation and consequent polymorphonuclear leucocytosis which sometimes proceeded to formation of a sterile abscess when some of the older solutions were used.

Section taken 11 days after injection shows increasing fibrosis while the 14 day section shows even denser fibrous tissue; new blood vessels are prominent and there is an occasional round cell but no polymorphs.

In the 23 day section there is seen further progress and the abundant fibrous tissue is seen to be wavy. The final section in this investigation was taken 42 days after injection and we have a picture of dense fibrosis with a strong compact appearance.

Results:

The results obtained through a careful study of about 6,000 cases treated by the injection method in the United States during the past few years, indicates 92% of cures. A comparative study of the operative method was obtained in 1,100 cases which showed only 80% of cures. This seems a very low figure and one which I should expect to be disputed and yet I think it is agreed by all surgeons that recurrence in hernia is a very difficult thing to assess. If a patient has a recurrence he very often goes to another surgeon, so that the original operator has no accurate knowledge of his percentage of recurrence. I cannot say if I have any recurrences to my credit from the operative method but using Gallie's method of fascial repair I do not think recurrence would amount to 20% or even 5%. Dr. Fraser of the Workmen's Compensation Board estimates recurrence at about 10% which should be a reliable figure for Manitoba.

With regard to the cases which I have treated by the injection method, sufficient time has not elapsed to draw any definite conclusions. I have treated twenty-five herniae in 22 patients. Of these there have been two recurrences but these were the first two cases I treated and were caused by faulty technique, due to inexperience. The first, a man of 64 years of age, had had an operation 15 years ago. It had recurred one year ago, as a direct hernia, and in carrying out treatment I did not place a sufficient number of treatments in Hesselbach's Triangle to bind the Fascia Transversalis and conjoined tendon down. The second case I believe was due to insufficient treatment at the abdominal Inguinal Ring. Each case has had further treatments and now appears to have an excellent result. It is interesting to note that in Minneapolis during operation for acute appendicitis in patients previously treated for hernia, nothing but a slight dimple has been observed at the Internal Ring and the finger tip could not be pushed through the ring.

The patients have all been very pleased with the treatment. The advantages, provided the results are comparable to those with the surgical method, are obvious. The patient requires no hospitalization, no anaesthetic, and no operation. He receives his treatment and continues at his work thereby, saving 6 to 8 weeks' salary.

One patient, a commercial traveller, 45 years of age, had had a hernia for 10 years and had neither the time nor the inclination to have an operation. He was fitted with a truss, wore it for 2½ weeks while on a business trip in the United States and treatments were started on his return. He was here for three weeks during which his treatments were completed. He said he felt so much better and had so much more energy that he was almost afraid to go out on his next trip!

While many patients will prefer an operation and have it over with, there are many others who either from their financial circumstances, their occupation, or from what they call "the fear of the knife," avoid an operation, and I feel that if a surgeon by a method of treatment which proves equally effective, is able to save his patient an operation, it is his duty to that patient to do so.

While the method cannot be held to replace surgery entirely, it is a procedure which the surgeon may adopt in many cases with definite advantage to his patient.

BIBLIOGRAPHY

1. Valpeau, M.—"The Anatomy and Surgical Treatment of Hernia" D. Appleton & Co., p. 272, 1892.
2. Mayer, Ignatz—"Treatment of Hernia by Subcutaneous Injection" Medical Journal & Record. 125: 528, 596, 672, 1927.
3. Warren, J.—"Quoted by Mayer."
4. Bratrud, A. F.—"The Ambulant Treatment of Hernia." Minnesota Medicine, July 1935, Vol. XVIII, p. 441.
5. Rice, Carl O.—"The Injection Treatment of Hernia." Minnesota Medicine, May 1934, Vol. XVIII, p. 248.
6. Rice, Carl O.—"Rationale of the Injection Treatment of Hernia." Minnesota Medicine, Sept. 1935, Vol. XVIII, p. 623.
7. Mestre, Pina—"Las Inyecciones Proliferantes Obturadores en las Hernias." Laboratoria 11: 3719.

The average physician employs Ampoule products regularly in his practise.

In selecting his materials he looks for well-established Brands. It is for that reason that "**BRAND SYNTHETIC**" ampoules are favoured.

SODIUM CITRATE 2½%, in 50cc ampoules for blood transfusions.

SODIUM COMPOUND, (Sodium Iodide 1gm. Sodium Salicylate 1gm. and Colchicine) for Rheumatism.

SODIUM THIOSULPHATE SOLUTION for arsenic dermatitis or bismuth and mercury stomatitis.

SODIUM IODIDE for Neurosyphilis.

SYNTHETIC DRUG CO., LTD.

243 COLLEGE STREET

TORONTO

ANAEMIA: Inorganic Iron.

Clinical experience has demonstrated the superiority of NASCENT Ferrous Carbonate (as exclusively exhibited in the Bipalatinoid) in inducing haemoglobin and erythrocyte recovery. No other form of Iron is so readily and rapidly assimilated with so little digestive or other disturbance.

Most authorities insist on large doses. One Bipalatinoid No. 501a, generates in a nascent and unoxidised condition, the theoretical Iron content of 15 grains Blands Pill, thus permitting large and effective doses to be given with ease.

Example: Bipalatinoid No. 500 5 gr. Bland.
Bipalatinoid No. 501 10 gr. Bland.
Bipalatinoid No. 501A 15 gr. Bland.

Combinations with Arsenic and Strychnine are also prepared.

OPPENHEIMER SON & CO.

LIMITED

Handforth Laboratories, CLAPHAM ROAD,
LONDON, S.W. 9.

Samples and Literature on Request from;
VAN ZANT & COMPANY
357 College Street Toronto, Ontario

LIVOGEN

VITAMINS B₁ and B₂

Extract of Liver

HAEMOGLOBIN

A valuable reconstructive tonic for use in the malaise following severe illness and in such other conditions of reduced vitality as asthenia, lassitude, lethargy and general debility.

Stocks are held by leading druggists throughout the Dominion and full particulars are obtainable from —



The British Drug Houses (Canada) Ltd.

Terminal Warehouse

TORONTO 2, ONT.

Lgn/Can/369

Special Articles and Association Notes

The Manitoba Medical Association Review

Formerly the Bulletin of the Manitoba Medical Association

ESTABLISHED 1921

WINNIPEG, SEPTEMBER, 1936

Published Monthly by the
MANITOBA MEDICAL ASSOCIATION

Editorial Office
101 MEDICAL ARTS BUILDING, WINNIPEG

Editor

C. W. MACCHARLES, M.D. (MAN.)

Advisory Editor

ROSS B. MITCHELL, B.A., M.D., C.M. (MAN.),
F.R.C.P. (C.)

Business Manager

J. GORDON WHITLEY

Annual Subscription - \$2.00

*Editorial or other opinion expressed in this Review is not necessarily
sanctioned by the Manitoba Medical Association.*

[COPYRIGHT] *

* Some Notes on the History of Infant Feeding

By

GORDON CHOWN, O.B.E., B.A., M.D. (Queen's)
F.R.C.P. (C.)

Assistant Professor of Medicine
University of Manitoba

Senior Physician to the Children's Hospital
Winnipeg

Following the custom of this Society, I have chosen for my topic a subject of historical interest relating to Pediatrics, viz., "The History of Infant Feeding."

It is a truism that a review of the past is of value in giving us a proper perspective of the present.

The history of infant feeding is only a small corner of a larger field of medical history but its importance will be hardly gainsaid.

Although both Hippocrates (460-370 B.C.) and Celsus (53 B.C.-A.D. 7) had shown in their writings that disease in the child differs from disease

in the adult and requires different treatment, and that the rearing of the infant with the troubles of dentition calls for special care, it was not until nearly a century afterwards, that the first treatise dealing especially with "Diseases of Children," was written by Soranus of Ephesus (A.D. 98-117).

The comprehensiveness of his treatise so far as infancy is concerned may be judged from a list of the subjects considered.

"On the care of the baby. How to know what is capable of being reared. How the cord is to be divided. How inunction is to be done. How swaddling should be done. On the baby's lying down. On feeding. On the choice of wet-nurse. On testing of milk. On the régime of the wet-nurse. What should be done if the milk dries up or becomes unwholesome or too thick or too thin. On the bathing and rubbing of the baby. How and when to give the breast to the baby. On the separation of the cord. When and how the baby should be freed (from its swaddling bands). How to practise it in sitting and walking. When and how to wean the baby. On teething. On aphthae. On rashes and itchings. On wheezing and cough. On seiriasis. On flux of the belly."

Soranus is the first writer to mention the method of testing the breast milk by the behaviour of a drop of milk placed on one's finger-nail. This continued in use for over 1,600 years; the first book on diseases of children written in English, the work of Thomas Phaer in 1545, repeats it in words which correspond very closely to Soranus' original description; "That mylke is goode that is whyte and sweete; and when ye droppe it on your nayle and do move your finger, neyther fleteth abroad at every stiring nor will hange faste upon your naile when ye turne it downward, but that whyche is betwene bothe is beste." It is repeated even as late as 1752 in W. Smellie's Treatise on the theory and practice of Midwifery.

Twenty to thirty years after the death of Soranus, the city of Asia produced a physician in the person of Claudius Galen (A.D. 130-A.D. 200) who was to be second only to Hippocrates in fame.

There is no systematic account of Diseases of Children amongst Galen's writings, but he refers to particular affections of children incidentally.

His directions as to feeding I quote "She shall feed the child only on milk, but when he has cut his front teeth it is well to accustom him to more solid food, as women do of their own accord, having learnt this by experience."

More than a century elapsed after Galen before Oribasius (A.D. 325-403) works appeared.

It is recorded that Oribasius wrote a complete work on medicine in seventy books. In his treatise "On the Feeding of an Infant" concerning

* Address of the Retiring President of Winnipeg Medical Society, read May, 1936.

a wet nurse he has this to say "One should select a nurse who has no disease of any sort, not too young and not too old. The youngest should be 25 years old, the oldest 35 years, and she should have a broad chest, large breasts and nipples which are not shut off and retracted. The rest of her body should not be excessively fat nor over lean. It is a great thing for the child that the nurse should have been delivered not long ago and preferably of a male child. Let her avoid things that are particularly drying, and salt things, and things which are pungent and astringent, and sharp and bitter and very heating things, and those that have a particularly unpleasant odour and strong savours and seasoning and other pungent things. The nurse should also abstain from venery and should do work with the hands and shoulders, so she should grind and weave and walk about with the child in her arms. She should carry the infant in the arms up to the age of three or four months.

Of all the Arabian physicians, none was more famous than Avicenna (A.D. 980) and none more frequently quoted by early English writers on medicine.

Avicenna maintains, as do the other writers I have mentioned, that failing the mother the choice of a wet nurse is an essential part of the care of an infant. Avicenna like some of his predecessors considers that it will be more prudent at the start that some other woman and not the mother should suckle until the mother has been restored to her former condition.

One might almost think that Avicenna anticipated some of the endocrine follies of today, when he says: "Some have reported that the teats of sheep and goats, particularly, eaten with their milk in them, have a notable effect in producing milk, and this either on account of similarity of substance or of some obscure quality." The value of massage of the breasts is recognized; "Frequent squeezing of the breasts produces a flow of milk."

With reference galactagogues he says: "Others recommend a drachm of dried bore-worms or earth-worms in barley water, taken for several days, and say they have found it most efficient. A similar effect comes from the head of flying-fish steeped in Dill water. Among things which increase milk in this way; take an ounce of cow's milk butter, put it in a cyathus of undiluted wine and drink it; or take sesame ground in a mill, mix with wine, pour it through a sieve and drink."

From the time of the Arabian physicians until the Renaissance there was none that left a name behind him as a writer in Pediatrics.

It was not until the invention of printing in the middle of the 15th century, which replaced the laborious hand copying, and restricted the diffusion of knowledge that the revival of learning really began so far as medicine is concerned.

So far as England is concerned the subject seems to have been in abeyance. In the 200 years following the invention of printing, i.e. up to 1650, there were only two English writers on Diseases of Children, Phaer and Whistler, and the latter only dealt with a particular disease, viz., Rickets.

Thomas Phaer, the father of English Pediatrics, 1510-1560, was born in Norwich. He was educated at Oxford and went thence to Lincoln Inn where he read law and attained a considerable knowledge in the municipal laws.

Phaer's "Booke of Children" was published in 1545. It was printed along with his translation from the French of the "Regimen sanitatis salerni," which Phaer entitled the "Regiment of Life," and "a goodly Bryefe Treatise of the Pestylence with the causes, signs and the cure of same" and "Declaration of the Veynes of Man's Body, and to what Dyseases and Infirmities the opening of every one of them does serve."

Phaer has many quaint remarks on infant feeding, but does not speak of any artificial means. He sums up the whole subject which to him lay between mother and wet nurse in the following words "Wherefore as it is agreing to nature, so is it also necessary and comly for the own mother to nurse the own child. Whiche if it maye be done, it shal be most cemensable and holsome, if not ye must be well advised in taking of a nource, not of yll complexion and of worse maners: but such as shal be sobre, honeste and chaste, well fourmed, amyable and chearefull, so that she may accustome the infant unto myrth, no dronkard, vyceyous nor sluttyshe, for suche corruptethe the nature of the chylde.

But an honest woman (suche as had a man chylde last afore), is best not within two monethes after her delyveraunce, nor approchyng nere unto her time againe. These things oughte to be cosidred of every wyse person, that wyll set theyr children out to nource. Moreover, it is good to loke upon the milke, and to se whether it be thicke & grosse, or to moch thinne and watrye, blackysshe or blewe, or enclynnyng to rednesse or yelowie, for all suche are unnaturall and evyll. Likewise when ye taste it in your mouthe, yf it be eyther bytter, salte, or soure, ye may wel perceyve it is unholsome."

He then quotes the nail test of Soranus, for the analysis of a perfect milk from a wet nurse.

Simon de Vallambert about 1565, was born at Avalon in Burgundy. He produced the first Pediatric work in French entitled "On the Feeding and Management of Children from their Birth."

He writes as much for nurses and midwives as for medical men. He says that "because the majority of these (midwives and nurses) are ignorant, I have undertaken the writing of this instruction to teach them, for what moved me to do so is a desire to be heard by the women of France. In any other medical matter which

belonged only to the cognisance of doctors I could not have ventured in this public way, because no one can rightly understand medicine, nor should adventure himself into the handling of it, except he be instructed and skilled in those languages which were written by the ancients and the earliest physicians. It is not a good thing that at the present time so many persons meddle with turning into French and publishing Galen, Dioscorides, and some of the handbooks of modern doctors with the object of giving them to be perused by rude and ignorant persons who abuse medicine: this is a matter with pernicious result and ought to be prohibited by Royal edict."

May not Vallambert be the originator of the prevailing idea in Public Health departments, that as soon as a baby is born, the mother should be inundated with literature, books, etc., on the care and feeding of children, and should be guided in these directions by a Public Health nurse.

His chapter on the feeding of the infant up to the time of weaning is by far the best that had been written up to that time. Weaning in those days was done at the age of eighteen months or two years, and it was customary to give other food in addition to the breast milk from the age of three months or even earlier, and he discusses the suitability of the various foods. He says that one of the first foods added was usually cow's milk or goat's milk (the latter he considers the more suitable), with semolina or flour or crumbled white bread boiled in it, sometimes with the addition of yolk of egg. He makes the first mention of a baby-feeding apparatus—"a horb with an opening at both ends, one end being made into the shape of a teat, through which the infant sucks the pap just as it sucks breast milk by the nipple."

Writer after writer had handed on the unwholesome advice of Avicenna that the nurse before giving bread or other solid food to the infant should chew it thoroughly in her own mouth, and then spue it, and put in with her fingers, into the infant's mouth. De Vallambert attacks this custom on several grounds. He says that under various conditions the saliva of a person may be poisonous to the infant. He thinks that food thus chewed by another may give rise to worms, and in any case the saliva of the individual has properties which make it suitable to him and not to another. So he condemns this practice; and he goes further with the logical conclusion that even to drink out of the same glass or cup as another person is unhealthy.

De Vallambert's chapter is full of sound practical observation on the connexion between faulty feeding and wasting, and he recommends goat's milk, almond-milk, blanmange, sweetened broth, and the use of nutrient enemata (not mentioned by any previous writer on children); he explains that these are of value for nutrition because the food is taken up by the mesenteric veins which lead to the liver.

The seventeenth century saw no contribution by any English writer to the subject of Diseases of Children until 1645 when Daniel Whistler (1619-1684) published the first detailed description of rickets.

Some five years later Francis Glisson in 1597-1677 published a more detailed account of rickets with diagnosis, illustrating the explanation of knock-knee and the deformity of the chest in rickets with diagrams.

Thomas Sydenham (1624-1689) made his name memorable in connexion with children's diseases, as the term "Sydenham's Chorea" still testifies, but little is known that he also made the original most minute and careful description of measles. His account of Scarlet Fever (1675) is less detailed, and strangely enough Sydenham usually an accurate observer, makes no mention of a sore throat.

Contemporary with Sydenham was another distinguished physician Thomas Willis (1621-1675) best known as an anatomist, especially for his work on the anatomy of the brain—still remembered as "the circle of Willis." Willis deals with epilepsy, and its treatment with frequent reference to children.

In 1689, there was published in London a little treatise, "*De Morbis Acutis Infantum*," which Still says attained a reputation far beyond its merits and was quoted for a least one hundred years. The author was Walter Harris.

His hypothesis was "The Antecedent and more distant Causes of the Diseases of Infants, however numerous or various they may be, all centre at last, in one immediate Cause, viz., in an acid prevailing through the whole habit."

Nay, the apparent variety of diseases in infants was itself mere fallacy, it was variation in degree, not in kind; "I make no scruple to assert that the Diseases of Infancy are very few in their kind, and differ only in Degree from one another" . . . "In short," he says, "all the complaints of Infants spring from an Acid as their Common Source." The curdled milk, the sour breath, the acrid smelling stools, the excoriation by the urine, all this was surely proof enough that the fons et origo of infantile disorders was acidity.

The treatment was correspondingly simple, some form of calcium carbonate must be given to neutralize the acid, which is then to be expelled by an aperient.

Ruhrh comments as follows with reference Harris' theory of acidity "and what is acidosis." We present day moderns are too prone to the vulgar error that our own opinions are new and original. As a matter of fact for the most part they are neither. Ideas do not die. They fall asleep, perhaps for centuries, and then come to life often simultaneously in several different places.

If one is interested he should read Harris' absolutely accurate description of what we today call acute gastro-intestinal intoxication.

His statement about the seasonal appearance of diarrhoea is equally true today—"From the middle of July to about the middle of September, the Epidemical Gripes of Children are so rife every year, that more of them usually die in one month, than in three or four at any other time: For the heat of that season commonly weakens them at least, if it does not entirely exhaust their strength."

Harris knew full well the importance of correct diet in early infancy and cautions against errors in this regard. He condemned the use of flesh in infancy, and stated the results of this regimen are almost inseparable from the over-feeding or underfed infants.

Harris today might be classed in the category of good salesman, in that he changed his religion from Protestant to Catholic and again back to Protestant.

The last writer on diseases of children in seventeenth century was John Peehey (1655-1716).

Peehey has much to say about the general upbringing of children and the responsibilities of parents.

In his chapter "Of Children's Wasting," after mentioning faulty breast milk as a cause, he says: "The blood should be generated and transmitted thro' the veins to the whole body, yet if there are worms in the back, arms, legs, and almost over the whole body, and there are so sometimes, the nourishment will be devoured by them. These worms are very small and are bred in the skin, and the heads of them appear like black hairs, upon friction in a bath; they are generated by vicious matter shut up in the capillary veins turned into worms, when transpiration is hindered."

This curious description appears with slight variations in several earlier writers. Peehey was no original observer. He was to repeat what others have said before him, "a la the writer."

It will be seen that the English writers on Pediatrics during the seventeenth century concentrated more on special diseases of children than on their feeding.

Rickets, chorea, scarlet fever and whooping cough were now recognized as diseases *sui generis*.

The beginning of the eighteenth century saw the introduction into England of the first steps in preventive medicine, not only as far as vaccination against smallpox is concerned, but as regards infant feeding and hygiene.

In 1729 a student at Leyden, Richard Conyers then twenty-two years of age, read a thesis in Latin, "De Morbis Infantum" for the degree of Doctor of Medicine.

Conyers returned to England and became physician to the Foundling Hospital in London which was opened in 1739.

In 1748 an essay by an anonymous writer on

the nursing of children was addressed to the Governors of the Foundling Hospital in which were advocated methods which Conyers himself advised 20 years earlier in his graduation thesis. To establish his priority Conyers decided to republish his dissertation.

Richard Conyers must have the credit of being one of the earliest to recognize that the traditional methods of feeding were wrong. From the day of birth infants were given pap, which was often just flour mixed with milk and water, making a sticky paste, which Conyers says might be much more usefully employed by bookbinders in sticking pages together than given to infants as nourishment. He protested also against the practice of chewing pap before giving it to the infant: he recognized that infection might be conveyed by it.

The writer of the anonymous article entitled "An Essay upon the Management of Children from Their Birth to Three Years of Age" was William Cadogan of Bristol (1711-1797), of which nine editions appeared in 20 years.

He hopes that the Foundling Hospital may be a means of introducing more rational methods: the ignorant still follow the example and transmitted customs of their great grandmothers; and if any one wants proof of the faulty character of the present mode of managing children let him "look over the Bills of Mortality, there he may observe that almost half the number of those that fill up the black list are under five years of age."

Cadogan was the first to raise his voice against the overclothing of the infant, so generally prevalent in his time. "The first great mistake is that they think a new-born infant cannot be kept too warm; from this prejudice they load it and bind it with flannels, wrappers, swathes, stays, etc., commonly called cloaths, which all together are almost equal to its own weight (he advises light loose garments, which he thinks) would be abundantly sufficient for the day, laying aside all those swathes, bandages, stays and contrivances, that are most ridiculously used to close and keep the head in its place and support the body, as if nature, exact nature, had produced her chief work, a human creature, so carelessly unfinished as to want those idle aids to make it perfect. Shoes and stockings are very needless incubrances, besides that they keep the legs wet and nasty if they are not changed every hour."

Cadogan advocated that nothing should be given to the infant until it was put to the breast six or seven hours after delivery. He advocates feeding from both breasts at a feed. "Four times in 24 hours will be often enough to give it suck, letting it have as much as it will take out of both breasts at each time . . . no other Woman's milk can be so good for her child; and dry-nursing I look upon to be the most unnatural and dangerous method of all; and according to my observation not one in three survives it." A sufficiently severe indictment of the methods of

artificial feeding in his day! At the time when Cadogan wrote one-third of the total mortality at all ages occurred under the age of two years, and a few years later (when it is possible to compare the deaths with the births), e.g. in 1762 and 1763, there were over 500 deaths under two years of age per 1,000 births, and about 70 percent, of children under five years of age.

Like Conyers he condemns in no uncertain term the practice of feeding "Pap" or giving the baby to some other woman to nurse before the breast milk is established.

However, he anticipates the twenty century book on infant feeding in United States, based book on infant feeding in United States, for he recommends that at three months of age solids should be given, and in addition to the breast feeding the infant should be fed twice a day some light food, he says "Good bread is the lightest thing I know. Cow's milk is also simple and light and very good for them but it is injudiciously prepared. It should not be boiled, for boiling alters the taste and property of it, destroys its sweetness and makes it thicker and heavier and less fit to mix with the blood. I would advise therefore that one half of infants diet be thin light broths, with a little bread or rice boiled in them which last is not so acescent as any other kind of meal or flour . . . the other part of children's diet may be a little bread and water boiled almost dry and then mixed with fresh milk not boiled. This, without sugar, spice, or any other pretended amendment whatever, will be perfectly light and wholesome . . . twice a day and not oftener a sucking child should be fed at first, once with the broth, and once with the milk thus prepared. As to the quantity at each time, its appetite must be the measure of that; its hunger should be satisfied but no more . . . When they come to be about six months old they may be fed three times a day which I think, they ought never to exceed their whole lives after. By night I would not have them fed or suckled at all . . . Let this method be observed about a twelvemonth when, and not before, they may be weaned." The child is to be "kept clean and sweet, tumbled and tossed about a good deal, and carried out every day in all weathers."

Urging mothers to suckle their children he points out how much more placid and good-tempered infants are with this feeding. "There would be no fear of offending the husband's ears with the noise of the squalling brat. The child was it nursed in this way would be always quiet, in good humour, ever playing laughing or sleeping. In my opinion a man of sense cannot have a prettier rattle (for rattles he must have of one kind or another) than such a young child."

Cadogan has this to say about the system of baby farming which was very general at this time:

"I am quite at a loss to account for the general practice of sending infants out of the home to

be suckled or dry-nursed by another woman, who has not so much understanding, nor can have so much affection for it as the parents: and how it comes to pass that people of good sense and easy circumstances will not give themselves the pains to watch over the health and welfare of their children: but are so careless as to give them up to the common methods, without considering how near it is to an equal chance that they are destroyed by them. The ancient custom of exposing them to wild beasts or drowning them would certainly be a much quicker and more humane way of despatching them."

Ruhrah makes this reference to the life of William Cadogan, "In all the wealth of propagandist literature of the numerous agencies for child welfare and the prevention of infant mortality, one has yet to see the name of Cadogan. And this, when no one else has ever put the case and its necessities more strongly. Cadogan shouts with no uncertain voice; he made himself heard and started the ball rolling. Others have pushed it along and now thousands of workers are helping; not all push in the same direction, the progress is not as rapid as it should be, but the intention is good if some of the zeal be misdirected. The proof of the work is still in the mortality bills. The rates are going down. One hopes then to see proper respect given Cadogan by the 'uplifters' as well as by pediatricists."

To those who wish to spend an extremely interesting hour, I would recommend that you read the life of William Cadogan in "Pediatrics of the Past" by John Ruhrah.

The profession in these days severely criticize the so-called counter prescribing by druggists.

In Red Lion Street, Holborn, in 1753 there lived an apothecary named James Nelson. He was married and had seven children. What a bedside clinic. Like some later writers he turned the study of his own children to good account.

He had no University training or degree and pleads for friendly forbearance and mutual co-operation between the two orders. He became widely known as the writer of a thoughtful book, "An Essay on the Government of Children under Three General Heads, viz. Health, Manners, and Education."

In his introduction he says with some truth: "Were none to engage in a state of wedlock in order to become parents till their abilities to train up their little offspring were tried and approved, I am of opinion the number of Marriage Licenses would be greatly abridged." He was an ardent reader of Cadogan but he went one better probably from experience with his seven children and advised reducing the period of nursing to nine months.

He has no objection to the giving of pap as an addition to breast-feeding, but he urges that it should be made with milk as well as water added to the bread, and says that there were

those who used water-pap only, and this even when the child was having no breast-milk. It is hardly to be wondered at that, as he mentions elsewhere, "rickets was a distemper extremely common in London."

In 1772 Dr. Hugh Smith of London published a very popular book "Letters to married women on nursing and the management of children." In the introduction he quotes figures from the bills of mortality for London and its environs. They show that about two-thirds of children born in this area died before the age of five years, and about 75% of these deaths occurred under the age of two years.

Smith says, "disease and death are the usual consequences of the present erroneous methods of bringing children up by hand."

To Smith belongs the credit of being the first writer to teach the sufficiency of breast milk alone for the feeding of infants up to six or seven months, and was much opposed to pap as a complimentary feeding as advocated by earlier writers. He is the father of what is now known as "the four hour system of breast feeding at stated hours."

At six or seven months he advised that children be fed in addition to the breast 4 ounces of broth with a little bread mixed in it, once or twice daily.

His remarks on cow's milk are interesting: "I know very well that many persons and perhaps some gentlemen in the practice of physic will differ from me in opinion when I prefer cow's milk to every other kind of nourishment in the early months where it is necessary to bring a child up by hand . . . the milk of cows appears I think to be the properest substitute we can make for that of the breast; and will answer best after the first month or two without boiling, unless it purges the child: in which case boiling it, will generally prevent the inconvenience proceeding in all likelihood from its oily particles. I have no objection to a small quantity of Lisbon sugar being mixed with it particularly if the child be costive and indeed this may very frequently be of use to prevent its too great tendency to become acid from which disorders of the bowel sometimes arise . . . In case the milk be thrown up in a curdled state a small quantity of salt will generally prevent it: a circumstance I would wish to have attended to, as many children are subject to this complaint and it is a method I have seldom known to fail unless they are greatly overfed . . ."

His contribution to the subject of infant-feeding took not only the form of advice, he was the inventor of a "bubby-pot," the object of which was to imitate nature in making the infant labour for its food. His invention was a stage in the evolution of the modern feeding-bottle.

The most advanced writer on diseases of children in the 18th century was Michael Underwood (1737-1820).

He was a member of the Corporation of Surgeons, and in 1784 became a Licentiate in Midwifery of the College of Physicians. At his death he was the last survivor of this now extinct licentiateship.

In 1783 as a surgeon he published "A Treatise upon Ulcers, Scrophulous Sores and Mammary Abscess."

In 1784 his first edition of his, "Treatise on Diseases of Children with Directions for the Management of Infants from Birth, Especially such as are brought up by Hand, appeared."

To quote Still "It is not given to many books (a volume of 288 pages) on medical subjects to pass through at least seventeen editions and to remain in favour and use for over sixty years. But Underwood's treatise was manifestly superior to anything that had been written on the subject; it gathered up all the most recent research and discovery in diseases of children. With Underwood paediatrics in England had crossed the Rubicon; the modern study of diseases in childhood had begun. There was still far to go, but Underwood had pointed the way, and with the dawn of the nineteenth century, paediatrics, thanks to him, was in a better position to go forward than it had ever been before."

Ruhrah himself in late life a victim of Poliomyelitis gives Underwood the credit of being the first to describe anterior Poliomyelitis. Still states that he was the first to include congenital heart disease in a treatise.

Underwood was greatly influenced by Harris and Cadogan, but disagrees with Cadogan, who believed that teething is scarcely to be ranked among diseases of infants. Underwood says "I have therefore no doubt but the time of dentition ought to be ranked amongst the most dangerous to infants, and the greatest attention ought to be paid to it."

My own teaching to students is that teething produces nothing but teeth.

Underwood notes the invention of the nipple shield, a new contrivance, recommended for the same purpose then as now.

The third volume of his fourth edition marks a great step forward in the matter of infant feeding. No treatise had hitherto considered the chemistry of milk.

As late as the second half of the 18th century the primitive nail test described by Soranus 1600 years before was still being taught by writers on infant feeding, so little had medicine progressed; but in 1761 an inaugural dissertation, of unusual value, had been written for the degree of M.D. in Edinburgh by a student, Thomas Young, upon milk. In this thesis he records many experiments upon milk, its behaviour with admixture of alkalies, gastric juices, etc., its composition, and the difference between fore-milk and after-milk. Thomas Young, who afterwards

became Professor in the University of Edinburgh, was a pioneer in the chemistry of milk. The following year (1762) John Ruttly published *The Analysis of Milk and the Several Species thereof*, and continental writers were also beginning to study the chemical properties of milk. Underwood quotes a table showing the analysis of human, cow's, goat's, ass's, and mare's milk by M. Boysson.

Advancing on the lines that had guided it in the last fifty years, infant feeding during the nineteenth century showed at least three notable developments. The first in importance, though not in time, was the final acceptance, after long struggles, of the principle of artificial feeding. The second was the demand for special foods suitable for infants, a need, the commercial value of which was quickly recognized and led to the growth of an enormous trade in proprietary foods. The third was the invention of a simple vessel or sucking-bottle from which a child could take its food in a natural manner. Each of these developments will be considered in turn, but we must first trace the changes in the practice of breast-feeding.

We learn that in 1802 four different methods of feeding were recognized: (1) Suckling by the mother; (2) suckling by a wet-nurse; (3) feeding with animal-milk; (4) feeding with bread and water (pap). Of these the first remained the method of choice. No one, however, appears to have made any observation on the quantity of milk secreted by women or the amount needed by infants. Consequently a silence was still preserved on all practical points dealing with breast-feeding. To make up for this, the horizon is kept filled with the question of weaning. At last, however, the belief that the matter was to be settled by counting the milk-teeth was beginning to be shaken. The object-lesson of Marcus Curious Dentatus was taken to heart and the reformers began seeking out other difficult cases. Louis XIV of France was born with a couple of teeth, so was Richard III of England.

Shakespeare had evidently heard of this curiosity, for he makes the young Duke of York say of Richard III.:

"Marry, thy say my uncle grew fast
That he could gnaw a crust at two hours old."

In the opening years of the century mixed feeding was in general use. A variety of messes was recommended for breast-fed children a few weeks old. Water-pap still figures prominently, while oatmeal, rice, or barley boiled in cow's milk is given at the end of the first month. Herbs made of cowslips or star-of-anise and milk is an excellent substitute for pap. The German custom of administering a good beer-soup as soon as the first incisors show themselves is approved of. Whether the infants of the period appreciated these dietetic experiments we cannot now tell. No surprise is felt at the contemporary mention of a "three-months belly-ache" that was pre-

valent among children of that age, or of the "weaning-sickness" that lay in wait for the breast-fed infants.

Fortunately these crude methods led before long to a reaction. By 1825 it had become recognized by many that for the first five or six months at any rate mixed feeding should be avoided, and the breast alone given. In spite of this conclusion, however, artificial feeding continued to develop, though the obstacles in its way were for a long time serious.

The greatest obstacle in the way was the high mortality among hand fed infants. In the early part of the 19th century in London, hand feeding was fatal to seven out of eight children.

The other difficulty was the lack of suitable feeding utensils. Ordinary cups and spoons were ill adapted for the purpose.

A cow-horn was the original sucking bottle first described in 1783. The horn was taken from a calf or small cow and held about a gill and a half; it was scraped and polished and its tip perforated; to a notch cut round the smaller end were tied two small pieces of parchment or leather "shaped like the tip of the finger of a glove and sewed together in such a manner as that the food passed into the horn can be sucked through between the stitches."

The impossibility of cleansing such an instrument of its accumulation of sour and decomposing milk, probably in no small way accounts for the high mortality.

The first glass feeding bottle dates from opening years of the nineteenth century. Time does not permit the various evolutions the glass feeding bottle went through, before the adoption of the feeding bottle we know.

In 1850 we find the artificially fed child provided with a fairly satisfactory feeding bottle, animal milk which was none too clean, and some choice in proprietary foods.

In 1862 artificial feeding was still in dispute because it was so unsuccessful.

In 1868 Dr. Eustache Smith's book "The Wasting Diseases of Children" appeared. Dr. Smith recommended two hourly feeds throughout with the addition of cream as well as sugar. Curiously enough he insists that the milk must not be boiled. For nearly twenty years the popular belief held that raw milk is better for children than boiled. This is still maintained even in Canada by food faddists, and not a few dairymen.

When boiling of milk became more generally adopted Dr. Smith in 1884 was able to write that the successful rearing of an infant by artificial means is not a difficult matter.

In the September 1935 number of the *Journal of Pediatrics*, Dr. John Lovett Morse under the title "Recollections and Reflections on Forty-Five Years of Artificial Infant Feeding" describes the condition in United States in the years 1889 and 1890:

"Most babies were fed on proprietary foods, a considerable proportion of which contained no milk and were mixed with water, in other words pap. Very few physicians had any idea what the mixtures contained, or would have understood, if they knew. They simply tried one after another, hit or miss. Those who used milk, with the exception of Meigs, Rotch, Holt, and a few others, had no definite plan. It was impossible to get clean milk. The importance of tuberculosis in cattle was unappreciated. The long tube nursing bottle was still in use. No one had ever heard of vitamins or calories. The few pediatricians of those days, led by Holt and Rotch, were putting up a fight in favour of milk as the food for babies instead of the proprietary foods. Rotch was sued by the Mellin's Food Company for his efforts. Much was said about milk being the natural food for the young animal. Analyses of the milks of many animals were made, and it was shown that, while the milk of the cow was not as much like human milk as that of some other animals, it should be used because it was the most abundant and most easily obtainable."

Morse critically reviews the various advances if they may so be called in the artificial feeding of infants and still maintains that the percentage method of feeding of the Boston School, cream skimmed milk, water and sugar is the most logical in that it made the food fit the particular baby rather than the present day idea of making the baby fit the food.

In the final paragraph of his paper Morse states "The most striking thing to me in reviewing these forty-five years is that, barring the discovery of the vitamins and the recognition of their importance in nutrition, in spite of all the advances in biochemistry during this time, all the innumerable investigations which have been carried out, and all the papers which have been written on the laboratory side of infant feeding, babies are now fed in almost the same way that they were at the beginning of this period. Jacobi in 1876 was feeding babies on a mixture of whole milk and barley water, boiled, to which he added cane sugar. Babies are now fed on mixtures of whole milk and water, boiled, to which Karo is added. A very large number of babies are still fed on the proprietary foods, but probably not quite as large a proportion as at the beginning of the period. It is only fair to say, however, that the proprietary foods are far better now than they were then. I am strongly tempted to remark with Puck, "Lord, what fools these mortals be."

Ruhrah devotes fifty-three pages of his book to Pediatric poems. I began my paper, quoting Soranus nail test for a perfect breast milk, and the requirements to be met by a perfect wet nurse. I shall conclude with part of a poem referring to the work of Soranus. The poem is taken from "Paedotrophia, or The Art of Nursing and Rearing Children," by Saint Marthe,

printed in Latin in 1584 and dedicated to Henry III., King of France and Poland.

If Health and Strength permit thee, don't refuse
The Child thy Nipple; nor another's use:
If to the Baby thou dost thy own deny,
Ill, will a venal Pap its Wants supply;
Ill, will the Bus'ness by that Nurse be done,
Who for another's Child neglects her own,
Yet, if thou'rt sickly, if thy Spirits fail,
If the Child's touch'd with any catching Ail,
This Duty, whether hated or desir'd,
Ceases, and 'tis no more of thee requir'd.
Then not to Suckle, is not to neglect,
But chuse a Nurse, and I'll thy choice direct.
A middle Age is best, nor Old nor Young,
Fresh be her Colour, and her Body strong;
Active and Healthy let her be, and Clean;
In Flesh, not over Fat, nor over Lean;
Long be her Neck, and broad her snowy Chest;
Her Arms of Full Extent, and Plump her Breast.
Let on each Pap a ruddy Nipple bud,
And the Twin-Hillocks strut with vary'd blood.
The Babe's delighted with a flowing Feast:
The sweetest and the whitest Milk is best.
If 'tis of an ungrateful Smell, be sure
Those Fountains to avoid, for they're impure.
Or if it sticks, when by the Finger try'd,
'Tis bad; nor shou'd it thence too swiftly glide.
She must not with a late Conception Teem,
Nor of the marriage Joy, forgotten, dream;
And as the Birth should not too long be past,
She should not lately have her Burthen cast.

POST-GRADUATE COURSE

The Post-Graduate Committee of The Faculty of Medicine announce a course of weekly lectures in Endocrinology to be held at the Medical College beginning in November. Professor A. T. Cameron will direct the course and deal with the theoretical aspects of the subject. The clinical side will be handled by various members of the faculty. This course will be open to all medical practitioners resident in Winnipeg. A full programme will be announced later.

DEPARTMENT OF NATIONAL REVENUE INCOME TAX DIVISION

—Ottawa, 9th July, 1936.

With regard to Clause 2 (i) of the Memorandum regarding Returns of Members of Medical Profession, issued under date of 28th February, 1933, wherein it is stated that as an alternative to (h) and (i) there may be allowed a charge of 10c per mile for automobiles used in the performance of professional duties, it may be said that as a result of experience since that memorandum was issued it is felt that the 10c per mile is a too liberal allowance, and while it is not proposed to reduce this allowance retroactively, yet the Department has come to the conclusion that for 1936 and subsequently this allowance shall be reduced to 8c per mile.

I shall be glad, therefore, if you will advise your members accordingly, sending me a number of copies of your circular in order that I may forward copies thereof to the Inspectors for their guidance.

C. F. ELLIOTT,
Commissioner of Income Tax.

Department of Health and Public Welfare

NEWS ITEMS

EPIDEMIC POLIOMYELITIS: There is no disease over which the public is more apprehensive and in which both the laity and the medical profession feel so helpless than Epidemic Poliomyelitis.

Acute Poliomyelitis is best described as an acute infectious fever, which may, or may not, proceed to invasion of the nervous system. Walshe submits that the practical conception of Poliomyelitis is obtained by the recognizing of the existence of three clinically and pathologically distinct stages of its evolution, but it must be emphasized that the three stages often overlap or synchronize. Sir Arthur MacNalty outlines these stages as follows:—

CLINICAL CHARACTER:

1. **"Initial Stage"**—This stage is variable in duration; it may last only a few hours and be unrecognized, or on the other hand it may extend to five or even ten days. The initial symptoms may be those commonly associated with the pre-eruptive period of the exanthemata—headache, pyrexia (102° – 103°), malaise, sore throat, tonsillitis, coryza, nasal discharge and irritability of temper. Epistaxis may occur and, in some epidemics, vomiting and diarrhoea are leading symptoms. There is no typical skin eruption; herpes and herpes zoster have been noted; erythematous or morbilliform rashes may occur, and cases have been erroneously diagnosed as scarlet fever or measles. The condition may clear up rapidly and complete recovery ensue (mild or abortive cases). On the other hand, the initial stage may merge into a second phase. Exceptionally there may be a remission period of some hours, or even days, between these phases in which the temperature falls to normal, the child appears to have recovered and perhaps is allowed to go about on the assumption that he has had a slight febrile ailment. But there comes a recrudescence of temperature and an accentuation of the disease.

2. **"The Pre-paralytic Stage"**—Indicates subarachnoid or meningeal invasion. It varies in intensity and duration, being at times so slight and transient as to be unnoticeable, and at others of great severity. On the whole its duration is short and it ends either in speedy recovery or passes into the paralytic stage within a few hours. The chief signs are continuation (or renewal) of the pyrexia and headache, onset of pains in the back and limbs with tenderness over the upper dorsal vertebrae, stiffness of the neck and spine with resistance to passive flexion, muscular twitchings (often indicating the site of future paralysis), hyperaesthesia, retention of urine, drowsiness and sometimes deep stupor, occasionally even opisthotonos. Diminution or disappearance of the superficial or some of the deep tendon reflexes may be the first indication of the nature of the case. Kernig's sign is frequently present.

3. **"Paralytic Stage"**—(stage of invasion of the central nervous system)—Once the virus is established in the central nervous system paralytic phenomena may appear, their character being dependent on the localization and intensity of the lesions."

Gordon states that the typical clinical case of Poliomyelitis is as follows:—

"After an incubation period of from seven to fourteen days, usually ten, the patient suffers from a relatively short febrile onset with symptoms as above described. This stage, the general systemic stage, lasts from one to two days and is usually followed by a period of remission of from two to three days.

The second stage is characterized by an exacerbation of the general symptoms and the onset of the symptoms mentioned above referable to the nervous system.

The onset of the acute paralytic stage occurs in from one to six days after the onset of the second stage."

The history of a very recent case in Manitoba exemplifies this character of the disease:—

August 4—A young female, aged 10 years, complained of slight headache, and had a temperature of 100.1, pulse 110 for about 12 hours. There were no other signs or symptoms apparent;

August 5, 6, 7—She appeared apparently well and was running around the farm doing considerable walking in the field;

August 8—At 3 a.m. she awaked her mother complaining of pains and cramps in her legs and was visited by two physicians at 11 a.m., who found the only positive symptom to be a slight injection of the throat. Her pulse was 80, and her temperature 98.4. The reflexes were normal; no headache or stiffness; no abnormal symptoms. In the evening she complained of tenderness and soreness in the legs, so much so that she slept very little that night;

August 9—She was seen in the morning by two physicians and her temperature was 101.4; her pulse 88. She had no headache, but her cheeks were flushed. There was slight redness in her throat and some stiffness in the back. She had vomited once during the morning and there was some generalized abdominal tenderness. The reflexes in the left leg were increased. The right leg showed complete absence of any jerk with positive Babinsky. There was no paralysis, but there was definite weakness and limp when she attempted to walk. The spinal puncture at this time showed a definite increased pressure but there is no report as to the cell count;

August 10—She showed complete paralysis of the right leg; partial paralysis of the left leg and some paralysis of the bladder.

DIAGNOSIS:

The initial symptoms of Poliomyelitis are usually indistinguishable from those of the onset of other infectious diseases, but it must be remembered that in Poliomyelitis this stage may pass very rapidly into that of involvement of the central nervous system and if there be any cause for suspicion of poliomyelitis the patient should be kept under close medical supervision so that the physician may detect the earliest sign of meningeal invasion.

Aycock and Luther describe the diagnosis of Poliomyelitis in the pre-paralytic stage as follows:—

"The child seems prostrated to a greater degree than the temperature, which is usually under 102 F., would indicate. The face is flushed, the expression is anxious, and there is frequently pallor about the nose and mouth. The throat is mildly injected, but not enough in itself to account for the child's condition. The pulse is usually rapid out of proportion to the temperature. The rest of the physical examination is negative, except for that portion which deals with the nervous system. There is frequently a rather coarse tremor when the child moves, which may be striking. There is a distinct rigidity of the neck; however, this is not as marked as that usually seen in meningitis. The patient tilts the head on the neck but does not bend the neck on the shoulders. As a result, the head can be brought about half way forward, when resistance is encountered, and the child complains of pain.

More constant and more characteristic than the stiffness of the neck is a stiffness of the spine. This is best brought out by having the patient sit up in bed and try to bend the head down on to the knees. The average child, ill with other infections, is very flexible and has no difficulty in doing this. If these patients bend forward at all it is from the hips, with the spine held rigidly. Many of them cannot assume a comfortable sitting position without propping themselves up on their arms. Anterior flexion of the spine often causes a drawing pain in the lumbar region. Kernig's sign is not usually marked at this stage, but the deep reflexes are frequently hyperactive rather than diminished, as they are later.

"A cerebral tache is almost always present, not infrequently becoming a purplish irregular blotchy line a half inch or more in width. It is the presence of these signs and symptoms which justifies a probable diagnosis of anterior poliomyelitis and calls for the final step in the diagnosis.

"This step is examination of the spinal fluid. The fluid is usually under moderately increased pressure (from 150 to 200 mm. of water). Macroscopically the fluid appears to be clear, but when viewed by transmitted light it presents a faint haziness which has been described by Zingher as a "ground glass" appearance. There is an increase in cells, usually between 50 and 250, but occasionally as high as 700 to 800, or as low as 20. These cells may be largely polymorphonuclear early, but later are lymphocytes. There is an increase in globulin."

Gordon remarks that "The diagnosis of Poliomyelitis in its early stages depends on a sound clinical suspicion and on an examination of the cerebrospinal fluid obtained by lumbar puncture. Three kinds of evidence contribute to the sound clinical suspicion, epidemiologic factors, the symptoms of the disease and the signs which may be elicited by physical examination."

During the year 1936 up until August 28th, there have been 70 cases of Poliomyelitis reported in the Province of Manitoba. 41 of these cases have occurred since the middle of June in one Municipality within a radius of ten miles. The following table shows the reported incidence of this disease in Manitoba from the year 1927 to August 17th, 1936:—

EPIDEMIC POLIOMYELITIS IN MANITOBA

1927 to August 28th, 1936.

	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
Jan.	..	..	1	..	..	..	..	1	..	..
Feb.	..	..	2	..	2	2	..	..	1	..
Mar.	..	..	..	1	1	1	..	..	..	..
April	..	..	1	1	..	..	1	..	..	..
May	..	1	..	..	1	..	1	..	1	1
June	..	1	..	1	..	..	..	1	1	4
July	..	9	3	..	..	..	1	..	..	17
Aug.	1	99	15	5	1	..	2	1	4	48
Sept.	3	264	15	18	6	3	..	2	9	..
Oct.	1	53	11	13	3	..	2	1	7	..
Nov.	1	4	6	5	..	1	..	4	..	..
Dec.	..	4	..	2	..	..	1	..	..	..
Total	6	434	55	45	15	7	8	10	23	70

EPIDEMIOLOGY OF POLIOMYELITIS:—

Sir Arthur S. MacNalty, in review of the epidemiology of Poliomyelitis, writes as follows:—

"**Seasonal Prevalence**—Although the disease tends to occur in the temperate rather than in the torrid zone, it has a well-marked seasonal prevalence in the warm months of the year, July, August and September. August is usually the month for maximal case-incidence. Sporadic cases and small outbreaks have been recorded in other months of the year and epidemics arising in late summer and early autumn may be protracted to include later months.

"**Geographical Distribution**—The most extensive epidemics of Poliomyelitis have occurred in Scandinavia, the United States, and in Australia and New Zealand. Most of the countries in Europe have experienced the effects of this epidemic malady from time to time, and outbreaks have been studied in France by Netter, and in Germany by E. Muller, P. Krause, and others. The occurrence of the disease in South America—for example, in Ecuador—has been observed. We have little information about the occurrence of the disease in Asia and Africa. Very severe and widespread epidemics have occurred in the United States, especially in the years 1907 and in 1916. In the latter year in New York City alone 9,063 cases were reported with 2,308 deaths.

"**Mortality**—The case fatality of poliomyelitis varies in different epidemics. An average variation is from 10 to 20 per cent. It depends upon whether the mild and abortive cases of the disease are recognized or escape detection in the different epidemics.

"**Age and Sex**—The age of the patient attacked by poliomyelitis has an important influence upon the fatality rate; the younger the age the better is the chance of survival. Ruhrah and Mayer state that adults are affected generally to the extent of about 10 percent in the various epidemics, but in this there are great variations, at times the percentage being higher and sometimes much lower. If a large number of the population fall victims to an epidemic, the proportion of adult cases appears to be high; for example, Muller reported a remarkable epidemic on the island of Nauru, where in a population slightly exceeding 25,000 some 700 cases of poliomyelitis occurred within a few weeks, the majority of which were in adults. In the New York epidemic of 1916 the number of cases reported in adults was considerable. The tendency in most outbreaks of poliomyelitis for a slightly greater proportion of males than females to be attacked. The percentage of deaths in males is also slightly greater than among females.

"**First and Second Attacks**—As a rule, one attack of poliomyelitis produces permanent immunity. There are exceptional and rare cases in which a definite second attack of poliomyelitis has occurred in the same individual. Two cases of the kind were noted in the New York epidemic of 1916. Eshner has reported the case of a girl in which eleven years elapsed between the two attacks. Sanz records a similar case with fourteen years' interval.

"**Incubation Period**—In experimental observations the incubation period is stated to vary from three to forty-six days, the general period being about eleven days. Clinical observations suggest an incubation period of from two to ten days, although shorter and much longer periods have been recorded . . .

"**Transmission**—The presence of the virus has been demonstrated in the nasopharynx of patients and of persons who give no definite history of having had the disease and who may, or may not, have been in known contact with it. Presumably, infection may be spread directly not only by patients but by persons apparently healthy. There is not sufficient reason to believe that the virus of poliomyelitis is conveyed to man by foodstuffs (including milk) or insects, or that the disease is associated with insanitary conditions. In the outbreak of poliomyelitis in 1935 in New York, a recent report states that the risk of contracting the disease was found to be greater in the richer than in the poorer districts. Similar findings have been recorded from other cities."

EPIDEMIC NATURE OF THE DISEASE:

"The recognition of poliomyelitis as an epidemic disease has been extraordinarily slow and even today the epidemic characteristics are not fully appreciated by all medical practitioners.

"To the Swedish physician Medin, belongs the credit of classifying Poliomyelitis as an epidemic disease. This was in 1881. From 1883 to 1886 small outbreaks involving groups of cases were reported from Italy, France, Germany, and Norway. MacPhail and Caverly in 1894 reported the first extensive American epidemic of 132 cases in Rutland, Massachusetts.

"The first English epidemic was described by W. Pasteur in 1897; he detected Poliomyelitis in seven members of one family at Much Hadham, a small village in Hertfordshire. Subsequently, Dr. Thomas Buzzard and Dr. F. E. Batten independently described an undue prevalence of the disease in London and elsewhere.

"In 1907 the classical monograph on the subject was written by Ivor Wickman, of Stockholm, the pupil and assistant of Medin, who made a thorough study of the epidemiology and first recognized and described the so-called abortive and non-paralytic cases. These cases are of great epidemiological and public health importance and when they are not reported and isolated are mainly responsible for the spread of the disease; they appear to be as capable of diffusing the infection as the well-marked cases which develop paralysis. Though having the initial symptoms of poliomyelitis the abortive cases stop short of paralysis and seem to recover quickly.

"The study of these epidemics has confirmed and supplied additional evidence to show that human contact from one individual to another is the chief, if not the sole, means by which poliomyelitis spreads in epidemic form, as Wickman first showed.

"It is now well established that infection may be conveyed by (1) persons suffering from an acute typical attack of poliomyelitis; (2) individuals having a mild or a typical form of the malady; (3) healthy persons who have been in close contact with the sick but have not themselves developed an attack; and (4) chronic carriers who have apparently quite recovered from a previous typical attack. Infectivity in acute cases is greatest during the early stages of the disease."

It seems to be generally accepted that the route of the virus from the nose is through the olfactory nerves, bulb and tract and thence through connecting tracts to the medulla and cord, avoiding the cerebral cortex and cerebellum.

PREVENTION:

The following are the remarks of Sir Arthur McNalty, Chief Medical Officer of the British Ministry of Health, on this subject:—

"In epidemics of Poliomyelitis infection is probably wide-spread in a community, but only a certain proportion of susceptibles are attacked.

"Until medical research has provided us with new weapons to combat Poliomyelitis, it behoves us to study the disease attentively and to learn from the established facts of its epidemiological behaviour and pathology what measures of prevention, administrative and otherwise, are practicable and desirable.

"... personal experience has convinced me that much can be done with the whole-hearted co-operation of medical officers of health and general practitioners to check the spread and severity of an epidemic. If the infectivity of

the disease is fully appreciated, if the existence of abortive and mild cases is realized, and if these as well as the more easily recognizable cases are notified and isolated in hospital or otherwise, potential sources of infection are shut off from susceptible individuals; thereby the exaltation of virulence by passage from individual to individual is prevented and the epidemic spreads to a much lesser extent than if uncontrolled. These are reasonable assumptions.

"As regards the measures that can be taken, first of all it is incumbent upon both medical officers of health and practitioners to improve the standard of notification of poliomyelitis. As judged from the patients who are seen at orthopaedic clinics suffering from the paralytic effects of the disease, many cases still fail to be notified in the early and acute stages. Particularly in epidemic periods an alert watch should be maintained for the abortive and mild types."

PRECAUTIONS AGAINST INFECTION:

It is difficult to say how long a patient remains infectious, but he should be isolated until three weeks after the onset of the disease providing all temperature has disappeared. Those in attendance should bear in mind that infection may be conveyed from discharges, particularly from the nasopharyngeal secretions and a surgical standard of nursing is indicated.

Contacts of the patient are to be quarantined for fourteen days from the date of the last exposure to a recognized case and food handlers are not to engage in their occupation for fourteen days after the last exposure to infection.

The house in which a case exists is to be placarded.

Recent experimental work undertaken by Armstrong and Harrison on the value of the application of chemicals to the nasal mucus membrane as a possible protective measure is summed up by these authors as follows:—

- "1. The instillation of various chemicals into the nostrils tends to prevent internasal infection of mice with encephalitis virus (St. Louis type) and of monkeys with poliomyelitis virus.
2. Picric acid, 0.32 to 0.64 percent either alone or combined with alum, was found to be superior to 4 percent alum and to be the most satisfactory and efficient experimental agent so far tried by the writers.
3. Picric acid in the concentration and amounts employed was devoid of detectable general or local injurious effects on animals. Sixteen applications sprayed by means of an atomizer into the nostrils of the authors produced no detectable injurious effects.
4. It is believed that picric acid exerts its protective effects locally, either by rendering the mucous membranes less permeable to infection or possibly by a direct action on the virus itself, or both.
5. The use of picric acid does not prevent the development of specific immunity in mice following a subsequent intranasal instillation of encephalitis virus.
6. Picric acid given to mice 1 and 2 days before, 1 and 2 days after, or on the same day as the virus instillation, led to a decreased susceptibility to the virus in all instances, as compared with nonprepared controls.
7. The protective effect of 0.32 percent picric acid is apparent against intranasally inoculated poliomyelitis for at least 4 to 7 days following its last administration.
8. Intranasally instilled chemicals effective in preventing encephalitis in mice have been found

effective against poliomyelitis in monkeys, suggesting that the former may be utilized as an indicator in a further search for more effective prophylactic agents in the latter ailment."

Further in this connection the Public Health Reports by the United States Public Health Service of July 17th, 1936 contains the following statement:—

"Statement regarding Nasal Spray as Preventive of Poliomyelitis: The recent experimental work by Doctors Armstrong and Harrison in preventing poliomyelitis in monkeys by the use of a nasal spray has excited so much interest and speculation that the Public Health Service deems it desirable to issue the following statement:

"The evidence regarding this method is as yet based entirely upon animal experimentation and the proposed spray is not at present to be regarded as of proved value in the prevention of Poliomyelitis in man. It may be advisable to await the results of further trials before giving the method general application. If, however, it is desired to use the solution, it should be sprayed into the nostrils three or four times on alternate days, and thereafter weekly during the presence of poliomyelitis. The spray tip should be pointed upward and backward at an angle of about 45°, and the spraying should be thorough enough to reach the pharynx as well, when a bitter taste will be noted. The early applications at least should be administered by a physician. The experimental work on animals is still being pursued. The tentative procedure is, therefore, subject to such changes as may be dictated by future findings.

"The most effective solution so far developed during experimentation on monkeys is prepared as follows:

Solution A: Dissolve 1 gram of picric acid in 100 cc of physiological salt solution (0.85 percent). (Warming facilitates solution of the picric acid).

Solution B: Dissolve 1 gram of sodium aluminum sulphate (sodium alum) in 100 cc of physiological salt solution (0.85 percent). Any turbidity in this solution should be removed by filtering one or more times through the same filter paper.

Mix Solutions A and B in equal amounts. The resulting mixture, which contains 0.5 percent picric acid and 0.5 percent alum is sufficiently antiseptic to prevent the growth of organisms and is ready for use as a spray. Homemade concoctions are not favored."

HUMAN CONVALESCENT SERUM:

Different reviews of the question as to the efficacy of human convalescent serum in the early stages of the disease appeared to yield rather inconclusive results. In Manitoba, serum is provided by the Provincial Laboratory at Winnipeg, and there appears to be some evidence to the effect that if used early, particularly within twelve hours of the onset, beneficial results are obtained.

ACTIVE IMMUNIZATION AGAINST POLIOMYELITIS:

Considerable work has been done by Kolmer and Brodie in this field. Kolmer's vaccine is supposed to be attenuated virus by treatment with sodium ricinoleate; while Brodie's vaccine is virus killed with formalin. These authors presented their material at the 1935 Annual Meeting of the American Public Health Association, but it was felt although Brodie's vaccine was safe it was not necessarily efficacious. On the other hand the opinion was expressed that Kolmer's vaccine was probably undesirable for use in its present state as there appeared to have been cases of paralytic Poliomyelitis following its use, and

Leake of the United States Public Health Service strongly recommended that the use of this vaccine in its present state be discontinued.

In the discussion which followed Rivers stated:

"Experience showed that recovery from most virus diseases results in an enduring immunity. Later it was found that the sera of individuals recovered from certain of these maladies possess neutralizing or protective antibodies. Consequently, a number of workers think that the presence of neutralizing antibodies in the serum of a person always indicates that the individual is immune. This is probably true when the antibodies are the result of a natural infection. In other words, the individual is known to be immune not because of the antibodies, but because of recovery from a natural infection as indicated by the presence of antibodies.

"The state of affairs may be different when a host is artificially immunized against certain virus maladies. Why?—I do not know. In any event, in vaccinated individuals resistance to infection does not necessarily parallel the presence of neutralizing antibodies, as has been demonstrated in dogs vaccinated against rabies. Furthermore, Hudson, Schultz, and Olitsky have shown that monkeys vaccinated against poliomyelitis may be susceptible to infection in spite of the presence of neutralizing antibodies in their sera. It is evident that the above observations are of significance when one attempts to evaluate the work of Brodie and Kolmer who lay a great deal of stress upon the fact that monkeys and human beings vaccinated according to their methods against poliomyelitis develop or increase the amount of antibodies in their sera.

"There is one fact that must be held in mind. It is that the virus of Poliomyelitis, either active or inactive, acts as though it was a poor antigen. Even large amounts of it in the active state administered intracutaneously or subcutaneously do not regularly produce resistance to infection in monkeys. Furthermore, intracerebral doses of active Poliomyelitis virus, too small to induce an obvious infection in monkeys, will not immunize the animals. Thus it does not follow that the introduction of active virus into monkeys and human beings will result in their effective immunization against infection. This fact is well illustrated by the findings of Schultz and Olitsky who repeated Kolmer's work on monkeys and were unable to demonstrate as much protection as that reported by Kolmer for his animals.

"The amount of antigen in the form of active poliomyelitis virus is a very important item in attempts to immunize monkeys by way of the intracutaneous or subcutaneous route. Even large amounts are not always effective, and investigators working in the effective range have invariably found that an occasional monkey becomes paralyzed as a result of the immunizing doses, and, for this reason, have considered it inadvisable to use active virus for the vaccination of human beings."

—C.R.D.

COMMUNICABLE DISEASES REPORTED

Urban and Rural - July, 1936.

Occurring in the Municipalities of:

Measles: Total 250—Winnipeg 54, Unorganized 42, Portage Rural 11, Woodlands 8, Dufferin 3, Minto 3, Portage City 3, Brooklands 2, Lakeview 2, Macdonald 2, Norfolk North 2, Rockwood 2, Thompson 2, Virden 2, Brandon 1, Brokenhead 1, Dauphin Town 1, Gimli Rural 1, Russel Town 1, Siglunes 1, St. Vital 1, The Pas 1, Victoria Beach 1, Whitemouth 1, Late Reported: May, Cartier 2, Harrison 1, June, Lac du Bonnet 85, Thompson 11, Unorganized 3.

Scarlet Fever: Total 90—Winnipeg 59, St. Vital 5, St. James 4, Kildonan East 3, Mossey River 3, Ste. Anne 2, Archie 1, Assiniboia 1, Cameron 1, Charleswood 1, Gilbert Plains Rural 1, Minto 1, Selkirk 1, Springfield 1, St. Laurent 1, Unorganized 1, Winnipeg Beach 1, Woodlands 1, Late Reported: June, St. Vital 2.

Chickenpox: Total 84—Winnipeg 22, St. Vital 20, St. James 17, Whitewater 9, Minto 5, St. Boniface 3, Brandon 2, Unorganized 2, Cameron 1, Flin Flon 1, Portage Rural 1, Victoria Beach 1.

Tuberculosis: Total 79—Winnipeg 12, Unorganized 10, St. Vital 6, Brandon 3, Ethelbert 3, Bifrost 2, Dauphin Rural 2, Lorne 2, Louise 2, Pipestone 2, St. Boniface 2, St. Laurent 2, Brokenhead 1, Carberry 1, Charleswood 1, Cornwallis 1, Fort Garry 1, Gilbert Plains Rural 1, Gilbert Plains Town 1, Gimli Town 1, Glenwood 1, Hartney 1, Lansdowne 1, Minnedosa 1, Morton 1, Norfolk North 1, Portage Rural 1, Portage City 1, Rapid City 1, Riverside 1, Roblin Town 1, Selkirk 1, Shell River 1, Springfield 1, Stanley 1, Swan River Town 1, St. Andrews 1, St. Clements 1, St. James 1, Ste. Rose 1, Tache 1, Virden 1, Westbourne 1.

Whooping Cough: Total 25—Winnipeg 21, Rosser 1, Selkirk 1, St. Andrews 1, Victoria Beach 1.

Diphtheria: Total 24—Winnipeg 7, Whitemouth 6, Whitewater 4, Minitonas 3, La Broquerie 1, Macdonald 1, Late Reported: April, Tache 1, June, Whitewater 1.

Mumps: Total 23—Unorganized 8, Winnipeg 5, Minto 2, Norfolk North 2, St. Paul East 2, Ethelbert 1, Roland 1, St. James 1, Victoria Beach 1.

Anterior Poliomyelitis: Total 12—Morton 6, Boissevain 2, Brandon 1, Dufferin 1, Rockwood 1, Late Reported, June, Morton 1.

German Measles: Total 12—Unorganized 3, Brooklands 2, Gimli Rural 2, Brandon 1, Roland 1, St. Boniface 1, Late Reported: June, Brandon 2.

Erysipelas: Total 8—Winnipeg 6, Siglunes 1, Ste. Anne 1.

Influenza: Total 7—Winnipeg 1, Late Reported: April, Strathcona 1, May, Brandon 1, Cypress North 1, Hamiota Town 1, Hanover 1, Saskatchewan 1.

Typhoid Fever: Total 6—Birtle 2, Brandon 1, Elton 1, St. Clements 1, Tache 1.

Septic Sore Throat: Total 2—Cameron 2.

Diphtheria Carriers: Total 2—Winnipeg 2.

Puerperal Fever: Total 1—Winnipeg 1.

Cerebrospinal Meningitis: Total 1—Brandon 1.

Venereal Disease: Total 129—Gonorrhoea 96, Syphilis 33.

DEATHS FROM ALL CAUSES IN MANITOBA

For the Month of June, 1936.

URBAN—Cancer 40, Tuberculosis 10, Pneumonia 7, Scarlet Fever 2, Syphilis 2, Influenza 1, Lethargic Encephalitis 1, German Measles 1, Measles 1, Puerperal Septicaemia 1, Typhoid Fever 1, Erysipelas 1, all others under one year 4, all others 135, Stillbirths 8. Total 215.

RURAL—Cancer 23, Tuberculosis 17, Pneumonia 16, Influenza 5, Measles 4, Diphtheria 1, Infantile Paralysis 1, Lethargic Encephalitis 1, Mumps 1, Puerperal Septicaemia 1, Typhoid Fever 1, Whooping Cough 1, Erysipelas 1, all others under 1 year 5, all others 165, Stillbirths 19. Total 262.

INDIAN—Tuberculosis 8, Pneumonia 2, Influenza 1, Cancer 1, all others under 1 year 1, all others 9, Stillbirths 1. Total 23.

LABORATORY POULENC FRERES OF CANADA LIMITED

The home of:

NOVARSENOBENZOL BILLON

And other highly ethical pharmaceutical specialties.

Rougier Frères 350 Le Moyne St. Montreal

NUPERCAINAL "CIBA"

There is just enough Nupercaine in Nupercainal "CIBA" to bring prompt and prolonged analgesic relief in distressing skin conditions. Irritation is soothed and pain subsides; thus earlier healing is prompted. Nupercainal "CIBA" enjoys wide professional acceptance as an application to haemorrhoids, burns, sunburn, bed-sores, and in pruritus ani and vulvae, etc.

In one ounce tubes with a rectal applicator.

Ciba Company Limited
MONTREAL

DILAXOL

(E. B. S.)

THE ORIGINAL

Each fluid ounce contains

Bismuth Subsalicylate 2 grs.

Digestive Enzymes 1 gr.

Magnesium Carbonate and
Hydroxide 75 grs.

Dose: One to two fluid drachms in water.



A pleasant, soothing antacid indicated in Hyperacidity and other Digestive Derangements, Nausea and Vomiting of Pregnancy.

Mildly laxative.

Specify "E. B. S." on Your Prescriptions.



The
E. B. Shuttleworth Chemical Co.

Limited

MANUFACTURING CHEMISTS

TORONTO

CANADA



A representative Stock of E. B. S. products carried by

CAMPBELL & HYMAN, LTD.

262 Edmonton Street

Winnipeg

Manitoba

PETROLAGAR MISCIBILITY Assures Effectiveness

To half a glass of water add a tablespoon of Petrolagar and stir. The miscibility of the Petrolagar emulsion is thus easily demonstrated. Such miscibility increases the effectiveness of the 65% pure mineral oil contained in Petrolagar for the treatment of constipation.

PETROLAGAR LABORATORIES of CANADA, LTD.

WALKERVILLE — MONTREAL

R MEMO

*Write or Wire
Brathwaite Ltd
Portage Avenue
Winnipeg
For
Pharmaceuticals
and
Rare Chemicals*

Telephone 21 085

Medical Library University of Manitoba

"The American Journal of the Medical Sciences"—
August, 1936.

"Acute Post-operative Necrosis of the Liver"
(so-called High-temperature liver death
Syndrome)—by John E. Sutton, Jr., M.D.,
F.A.C.S., Bellevue Hospital, New York.

The similarity of this condition in man and that
in dogs following ligation of the hepatic arteries is
noted. Thirty diagrams indicate as many variations
in the anatomy of the Hepatic Vessels in man.

"Acute Epidemic Encephalitis"—A Clinical
Study of 160 Cases—by H. A. Slesinger, M.D.,
Windber, Pa.

Reports of 160 cases seen over a period of two
months are given. The disease was highly contagious,
ran a benign course and carried very few residual
symptoms. Convalescent serum was of definite value
both as a prophylactic measure and in the active treat-
ment of the disease.

"Treatment of Peptic Ulcer by means of Injec-
tions"—by C. A. Flood, M.D., and C. R.
Mullins, M.D., New York.

A series of cases treated with Histidine was com-
pared to a control group treated by injection of
normal saline. Eight of twelve patients treated by
daily injections of saline experienced relief of pain.
Four of six patients treated with histidine showed
relief of pain. It is suggested successful results in
this form of therapy are due to the psycho-therapeutic
value of the injections rather than the nature of the
solution used.

"The Lancet"—August 8th, 1936.

"Operative Treatment of Severe Gastric
Haemorrhage of Ulcer Origin"—by Hans
Finsterer, M.D., Professor of Surgery,
University of Vienna.

"Annals of Surgery"—August, 1936.

"The Surgical Treatment of Irremovable Cancer
of the Pyloric Segment of the Stomach"—
by Rodney Maingot, F.R.C.S. (Eng.),
London.

"The Journal of the American Medical Association"—
August 15th, 1936.

"Resistance in Tuberculosis"—by James A. Mil-
ler, M.D., and Israel Rappaport, M.D., New
York.

"Pathogenesis of Tuberculosis"—by Max Pinner,
M.D., Oneonta Tuberculosis Hospital,
Oneonta, New York.

"Intravenous Treatment of Meningococcic Men-
ingitis with Meningococcus Antitoxin"—by
Archibald L. Hoyne, M.D., Chicago.

"Athletic Injuries"—by Marcus H. Hobart, M.D.,
Evanston, Ill.

"The New England Journal of Medicine"—
August 13th, 1936.

"Convalescent Care in Chronic Arthritis"—by
John G. Kuhns, M.D., and Robert J. Joplin,
M.D.

- “The Canadian Medical Association Journal”—
August, 1936.

“Internal Secretion as a Factor in the Origin of Cancer”—Leo Loeb, E. L. Burns, V. Suntzoff and Marian Moskop, St. Louis, Mo.

“Observations in the Action of Protamine and Insulin in the Treatment of Diabetes Mellitus”—by I. M. Rabinowitch, A. F. Fowler and A. C. Coreoran, Montreal.

“Studies in Mineral Metabolism.”

“Calcium and the Kidneys: Clinical”—by Bruce Chown, M.D., Winnipeg.

“Experiences in Leg Lengthening”—by E. C. Janes, M.D., (Tor.), Hamilton.

“The Moose River Mine Accident”—by H. K. MacDonald, M.D., C.M., Professor of Surgery, Dalhousie University, and W. Donald Rankin, M.D., Halifax.
- “The Effects of Privation in the Moose River Mine Disaster”—by Ian MacDonald, B.A., M.D., C.M., M.R.C.P. (Lond.), Halifax.

“Recent Progress in Severe Diabetes”—by Priscilla White, M.D., George F. Baker Clinic, E. P. Joslin, Medical Director, Boston.

“An Unusual Case of Meningococcus Meningitis”—by John V. V. Nicholls, B.A., M.Sc., M.D., Montreal.

“The Treatment of Empyema Thoracis”—by O. W. Niemeier, M.B., M.D., F.R.C.S., (Edin.), F.R.C.S. (C.), Hamilton.

“Autogenous Serum Treatment of Narcotic Addiction”—by Donald M. Black, M.D., St. Andrews Hospital, Lungchingtung, Manchuria.

“Chronic Sinusitis”—by G. Edward Tremble, M.D., Montreal.

LAF-IF-ULIKE

Sweet young thing (to her boy friend) “Would you like to see where I had my operation?”

Boy Friend—Oh! yes dearie.

S. Y. T.—“Well, just drive around the block and I’ll show you the hospital.”

♡♡♡

Judge—“If you will promise me to go straight from now on I’ll let you off on suspended sentence. Does the prisoner understand the meaning of straight?”

Prisoner—“Yes Judge, taking Dewar’s whiskey without ginger-ale.”

♡♡♡

Some men claim the women are the salt of the earth. But too much salt will cause a man to drink.

♡♡♡

The mining industry is flourishing in Manitoba, says a news item. But all the gold-diggers are not at the mines.

♡♡♡

Lady Esther says: “Men’s eyes are magnifying mirrors.” Maybe she got the idea while wearing a voile dress in an effort to keep cool this summer.

♡♡♡

All the Scotch in Scotland could not revive the guests at a party in Winnipeg that was rapidly dying from thirst about 2 a.m.

♡♡♡

An official says, according to an advertisement: “I owe my life to Bovril.” That’s just a lot of concentrated bull.

THE PERFECT END
TO A PERFECT DAY...

16	135	5	—	4	40
17	460	4		36	38
18	450	4		34	40
IN	3045	35		70	78
OUT	3255	35			80
TTL	6300	70			

19th Dewar's

DISTILLED
BLENDED AND
BOTTLED IN
SCOTLAND BY
DEWAR

TO GET THE BEST

Be sure to say

DEWAR'S

Special Liqueur

AWARDED
50 MEDALS

PERTH

GOLD & PRIZE
50 MEDALS

"SPECIAL LIQUEUR"

The Finest Scotch Whisky
of great age

John Dewar & Sons,
DISTILLERS Limited

London
Dewar House
Haymarket, S.W. 1
PERTH, SCOTLAND

BOTTLED IN BULK IN THE UNITED KINGDOM
UNDER GOVERNMENT SUPERVISION

Contains 35% Alcohol

DISTILLED AND BOTTLED IN SCOTLAND

AWARDED
50 MEDALS

PERTH

GOLD & PRIZE
50 MEDALS

"SPECIAL LIQUEUR"

The Finest Scotch Whisky
of great age

John Dewar & Sons,
DISTILLERS Limited

London
Dewar House
Haymarket, S.W. 1
PERTH, SCOTLAND

BOTTLED IN BULK IN THE UNITED KINGDOM
UNDER GOVERNMENT SUPERVISION

Contains 35% Alcohol

DISTILLED AND BOTTLED IN SCOTLAND

This advertisement is not inserted by the Government Liquor Control Commission. The Commission is not responsible for statements made as to quality of products advertised.

RAVENSCOURT SCHOOL

FORT GARRY, WINNIPEG

A Residential and Country Day School for Boys from the age of eight up. Courses leading to Matriculation, etc.

Apply for prospectus to—

N. A. T. YOUNG, M.A. (Oxon), Headmaster.

RIVERBEND

SCHOOL FOR GIRLS
WINNIPEG

Residential and Day Pupils
Well-Equipped Buildings—Beautiful Grounds
Gymnasium and Out-door Sports
Courses from Kindergarten to
Grade XII inclusive
Home Economics
Special Riverbend Diploma Course.
For Prospectus—Apply to The Principal
Miss J. M. Carter, B.A.

Immunize Against the Common Cold with M.V.R.I. Cutter

(No. 4 count)

MIXED VACCINE RESPIRATORY INFECTIONS, CUTTER, is prepared from selected strains of the organism commonly associated with the common cold and its sequelae. Cultures are constantly obtained for this vaccine from the various larger centers throughout the west, thus assuring a vaccine of non-static formula more specific for western use than one prepared from eastern cultures, or than a vaccine of unchanging flora.

EACH CC CONTAINS:

Staphylococci (Aureus) ..	500 million
Staphylococci (Albus) ..	500 million
Streptococci ..	200 million
Pneumococci ..	200 million
Catarrhalis ..	200 million
Friedlander ..	200 million
Influenza ..	200 million

Total 2000 million
per cc

MODES OF ISSUE:

5 cc Rubber Diaphragm vial
20 cc Rubber Diaphragm vial
3 dose syringe package

THE WINNIPEG DRUG CO., LTD.

H. D. Campbell

PRESCRIPTION SPECIALISTS

407 PORTAGE AVE. (Cor. Kennedy)

Phone 21 621

DREWRY'S

Estab. 1877

DRY GINGER ALE—a most inviting beverage for every period of sickness and convalescence.

CRYSTAL SODA—best of all plain sodas because there is no better made. Lithiated and most effective as a pleasant pick-me-up.

Remember the Exceptional Hygienic Conditions of our Plant in every Process.

Phone 57 221

The Drewrys Limited

McLEAN PRINTERS

Printers of "The Review"

Kelvin and Hart --:-- WINNIPEG

Phone 501 122

Medical Business Bureau

101 Medical Arts Bldg.

Winnipeg

COLLECTION of ACCOUNTS

PUBLIC STENOGRAPHY

AUDITING and BOOKKEEPING

J. L. HEWITT, Manager.

Manitoba Nurses' Central Directory

214 Balmoral St.

Phone 72 151

OFFERS HOURLY NURSING CARE

At \$1.25 for First Hour and 75c for each succeeding hour for any type of nursing care needed in the home.

All Services Rendered by Registered Nurses.

An 8-Hour Day at \$3.00 per Day

FOR VACATION

OFFICE HELP

Phone 25 843

SUCCESS

BUSINESS COLLEGE

Enrolling only Matriculation and University Students.